

WHAT IS CLAIMED IS:

1. A process for preparing a sodium glyphosate composition, comprising mixing in a reactor (i) particulate glyphosate acid, (ii) sodium hydroxide, (iii) water and optionally (iv) adjuvant to form a reaction mass wherein the  
5 total amount of water added to the reaction mass is from about 10% to about 40% by weight of all of the particulate glyphosate acid, sodium hydroxide, water and any adjuvant added to the reactor, thereby causing a reaction of the  
10 glyphosate acid and sodium hydroxide that generates heat causing partial evaporation of the water, and forms a sodium glyphosate paste having a moisture content of about from 2% to about 20% by weight.

2. The process of claim 1 wherein the molar ratio of sodium hydroxide to particulate glyphosate acid added to the reactor is from about 0.8 to about 1.25 moles of sodium hydroxide per mole of particulate glyphosate acid.

3. The process of claim 1 wherein the molar ratio of sodium hydroxide to particulate glyphosate acid added to the reactor is from about 0.9 to about 1.1 moles of sodium hydroxide per mole of particulate glyphosate acid.

4. The process of claim 1 wherein the molar ratio of sodium hydroxide to particulate glyphosate acid added to the reactor is from about 0.95 to about 1.05 moles of sodium hydroxide per mole of particulate glyphosate acid.

5. The process of claim 1 wherein the amount of water added to the reactor is from about 13% to about 35% by weight of all of the particulate glyphosate acid, sodium hydroxide,

water and any adjuvant added to the reactor.

6. The process of claim 1 wherein the sodium glyphosate paste formed has a moisture content of from about 2% to about 15% by weight.

7. The process of claim 1 wherein the sodium glyphosate paste formed has a moisture content of from about 2% to about 10% by weight.

8. The process of claim 1 wherein the sodium glyphosate paste formed has a moisture content of about 3% to about 5% by weight.

9. The process of claim 1 wherein the sodium hydroxide is added to the reactor as an aqueous solution of sodium hydroxide.

10. The process of claim 9 wherein the aqueous solution of sodium hydroxide contains from about 30% to about 50% by weight sodium hydroxide.

11. The process of claim 1 wherein the sodium hydroxide is added to the reactor as a solid.

12. The process of claim 1 wherein adjuvant is added to the reactor in an amount such that the weight ratio of adjuvant to particulate glyphosate acid added to the reactor is at least about 1:250 on a glyphosate acid equivalent basis.

13. The process of claim 1 wherein adjuvant is added to the reactor in an amount such that the weight ratio of adjuvant to particulate glyphosate acid added to the reactor

is from about 1:100 to about 1:2 on a glyphosate acid  
5 equivalent basis.

14. The process of claim 1 wherein adjuvant is added to  
the reactor in an amount such that the weight ratio of  
adjuvant to particulate glyphosate acid added to the reactor  
is from about 1:100 to about 1:50 on a glyphosate acid  
5 equivalent basis.

15. The process of claim 1 wherein the adjuvant added to  
the reactor is selected from a group consisting of nonionic  
surfactants, cationic surfactants, anionic surfactants,  
amphoteric surfactants, silicone surfactants, fluorocarbon  
5 surfactants, lubricants and mixtures thereof.

16. The process of claim 15 wherein the adjuvant added  
to the reactor is a cationic surfactant.

17. The process of claim 16 wherein the cationic  
surfactant added to the reactor is selected from a group  
consisting of alkylamine ethoxylates, alkylamine quaternary  
amines, alkylamine acetates, amine oxides and mixtures  
5 thereof.

18. The process of claim 1 wherein the process is a  
continuous process conducted in a continuous reactor  
comprising:

a substantially enclosed elongated chamber having (i) at  
5 an input end an aperture suitable for introduction of the  
particulate glyphosate acid, (ii) at an output end an aperture  
suitable for discharge of the sodium glyphosate paste, and  
(iii) between the input and output ends, one or more ports  
suitable for introduction of sodium hydroxide and water; and  
10 having disposed therein one or more rotatable shafts, each on

an axis parallel to the elongated dimension of the chamber and each having one or more screw elements coaxial with the shaft and bearing a plurality of radially disposed pins and/or paddles, such that rotation of the shaft effects one or more  
15 of the following: (i) feeding of the particulate glyphosate acid into the chamber through the aperture at the input end, (ii) mixing of the particulate glyphosate acid, sodium hydroxide, water and optionally adjuvant, (iii) transport of the reaction mass and the resulting sodium glyphosate paste  
20 towards the output end of the chamber, and (iv) discharge of the sodium glyphosate paste from the chamber through the aperture at the output end.

19. A continuous process for preparing a dry granular sodium glyphosate composition, the process comprising:  
continuously feeding (i) particulate glyphosate acid, (ii) sodium hydroxide, (iii) water and optionally (iv)  
5 adjuvant to a continuous reactor to form a reaction mass wherein the total amount of water added to the reaction mass is from about 10% to about 40% by weight of all the particulate glyphosate acid, sodium hydroxide, water and any adjuvant added to the reactor, thereby causing a reaction of  
10 the glyphosate acid and sodium hydroxide that generates heat and forms a sodium glyphosate paste;  
reducing the water content of the reaction mass using the heat of reaction of the glyphosate acid and the sodium hydroxide to cause partial evaporation of the water such that  
15 the sodium glyphosate paste formed has a moisture content of from about 2% to about 20% by weight;  
adding an adjuvant to the sodium glyphosate paste to form an extrudable sodium glyphosate mixture, the weight ratio of total adjuvant to sodium glyphosate being from about 1:20 to  
20 about 1:2 on a glyphosate acid equivalent basis;

continuously feeding the extrudable sodium glyphosate mixture to an extruder having an inlet, a conveyor and an outlet having a screen and extruding the extrudable sodium glyphosate mixture through apertures in the screen to form  
25 extrudate strands that break to form moist coherent granules; and,

drying the granules to produce the dry granular composition.

20. The process of claim 19 wherein a portion of the adjuvant is added to the reaction mass and the remainder of the adjuvant is added to the sodium glyphosate paste.

21. The process of claim 19 wherein the adjuvant is selected from a group consisting of nonionic surfactants, cationic surfactants, anionic surfactants, amphoteric surfactants, silicone surfactants, fluorocarbon surfactants,  
5 lubricants and mixtures thereof.

22. The process of claim 21 wherein the adjuvant is a cationic surfactant.

23. The process of claim 22 wherein the cationic surfactant is selected from a group consisting of alkylamine ethoxylates, alkylamine quaternary amines, alkylamine acetates, amine oxides or combinations thereof.

24. The process of claim 21 wherein weight ratio of total adjuvant to sodium glyphosate is from about 1:9 to about 1:2 on a glyphosate acid equivalent basis.

25. The process of claim 19 wherein a portion of the adjuvant is added to the reactor to form the reaction mass such that the weight ratio of adjuvant to particulate

glyphosate acid added to the reactor is at least about 1:250  
5 on a glyphosate acid equivalent basis.

26. The process of claim 19 wherein a portion of the  
adjuvant is added to the reactor to form the reaction mass  
such that the weight ratio of adjuvant to particulate  
glyphosate acid added to the reactor is from about 1:250 to  
5 about 1:2 on a glyphosate acid equivalent basis.

27. The process of claim 19 wherein a portion of the  
adjuvant is added to the reactor to form the reaction mass  
such that the weight ratio of adjuvant to particulate  
glyphosate acid added to the reactor is from about 1:100 to  
5 about 1:50 on a glyphosate acid equivalent basis.

28. The process of claim 19 wherein the apertures in the  
screen have a diameter of from about 0.5 mm to about 2 mm.

29. The process of claim 19 further comprising  
classifying or milling the dried granules to remove or recycle  
granules, fragments of granules and aggregates of granules  
that are outside a desired size range.

30. The process of claim 19 wherein, if the moisture  
content of the sodium glyphosate paste on completion of the  
reaction is a greater than about 15% by weight, further  
comprising applying heat and/or vacuum to the paste to further  
5 reduce the moisture content of the paste prior to forming the  
extrudable sodium glyphosate mixture.

31. The process of claim 19 wherein the extrudable  
sodium glyphosate mixture is of a consistency such that, the  
extrudate strands break spontaneously upon extrusion through  
the screen to form the moist granules.

32. The process of claim 19 further comprises breaking or cutting the extrudate strands to form the moist granules.

33. The process of claim 19 further comprises rolling and/or tumbling the moist granules to impart to the granules a more spherical shape and greater uniformity of size.